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# F. J. Ryan, Zoologist Who Refuted Reds

Dr. Francis Joseph Ryan, 47, a zoologist whose experiments helped disprove Russia's "official theories on heredity," died yesterday of a heart attack at his home, 80 LaSalle St. Dr. Ryan was chairman of the department of zoology at Columbia University.

The jovial, pipe-smoking scientist was one of Columbia's most popular teachers, largely through his ability to make a discourse on the theory of natural selection in bacteriological cultures, for instance, as airy as a discussion of the weather. A handball and tennis enthusiast, he would frequently tax his students' brains on the Mendelian theory of inherited characteristics and then whip up their muscles on the court.

In 1948 he published a significant report on experiments he had conducted with neurospora, the common red bread mold, and its value in studying cancer. The mold, he showed, will grow on a medium containing as food only sugar-water, salts and the single vitamin biotin. It does not need amino acids and the other vitamins required by man, for it can synthesize these substances from the simple foods in the medium.

After treatment with certain agents, such as X-rays or mustard gas, he grew strains of the mold which would not grow on the simple foods of the medium alone. By adding a further substance, such as amino acids or vitamins, he produced strains known as mutants because the new food requirements were inherited. Actually, they were shown to be due to genes. The original parent did not require vitamins because its genes enabled it to synthesize a vitamin from the simple foods in the medium.

Francis J. Ryan

Since cancer is a growth, albeit abnormal, and since growth must be understood to be controlled, Dr. Ryan's studies showed neurospora to be a convenient subject for experiments compared with man, a poor medium for such tests. The mold, he said, can be made to require the same vitamins and amino acids as man requires. Mutations in it are inherited in the same way as in man himself because the two organisms are fundamentally the same. By the use of the mold, the sciences of heredity and biochemistry could be jointly brought to bear on the problem of growth.

The following year Dr. Ryan published a report on experiments on the relative roles of heredity and environment in the evolution of plants and animals which contradicted the theories of Russia's famed plant breeder, Prof. T. D. Lysenko, and created considerable agitation in Soviet scientific circles.

Lysenko had insisted that hereditary characteristics can be changed at will by changing the environment, and then be transmitted to succeeding generations. This, the theory of acquired characteristics, had been generally discarded until Lysenko revived it, to the wild acclaim of some Communists. Others who refused to go along were exiled, dismissed or liquidated as supporters of "bourgeois genetics."

Dr. Ryan's researches, carried out on bacteria, demonstrated that a change in environment does not influence heredity in any way, and that certain micro-organisms that appeared to have changed as the result of an altered environment actually had inherited the changes beforehand.

"Adaptation, then, is compounded of a chance mutation and the selective action of the environment," Dr. Ryan's report said. "Knowledge is needed of the cause of random mutations in order to control them, because at present we can control only the environment.

"When we need no longer to use the word 'chance' to describe the mutation process, we shall possess knowledge fundamental to a better understanding and control of cellular growth and change. It is a change in the growth of population of cells within the body which we at present call cancer."

Dr. Ryan, who was born in Brooklyn, was a Columbia alumnus, getting his A. B. there in 1937, his M. A. in 1939 and his Ph. D. in 1941. He was a Fulbright and Guggenheim fellow to the Pasteur Institute of Paris in 1950-'51 and a Fulbright fellow to the University of Tokyo in 1955-'56. He was a visiting professor at the Hebrew University in Jerusalem in 1960 and a fellow of the Academy of Arts and Sciences. He was also a recipient of the Newberry prize.

Surviving are his wife, Mrs. Elizabeth Wilkinson Ryan; his father, Joseph L. Ryan; two brothers, Robert W. and Richard J., and three sisters, Mrs. Marguerite Dibble, Mrs. Rosemarie Perry, and Mrs. Jean K. McCarthy.

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